Changing Mathematics Curriculum: A Slippery Slope
Slip slidin' away

Slip slidin' away

You know the nearer your destination

The more you're slip slidin' away...

~ Simon & Garfunkel
Susan McLoughlin
Cynthia Roemer
Arlene Rogoff
Community college mathematics programs are under increasing pressure to improve student success. Revisions to placement criteria, accelerated curriculum paths, and innovative pedagogy are among strategies to meet these demands. One faculty team shares their five year journey while encouraging participant discussion on rapidly changing mathematics education practices.
Session Description

• Focus primarily on developmental into gateway courses

• Share our experiences

• Facilitate sharing of your experiences
Get Acquainted

Complete the Venn diagram, discussing what you have in common and what is unique about each of your mathematics curricula.

• Demographics
• Governance/Decision-Making
• Placement Testing
• Course Offerings
• Success & Challenges
• STEM/Non-STEM
UNION COUNTY COLLEGE

• Community & Student Population

• Governance & UCC Structure

• Placement Testing & Courses
Community & Student Population

- 3 Campuses
- 11,781 students in the Fall of 2014
- Student Population
- Hispanic Serving Institution
- First-time, Full-time degree seeking students:
  - 36% place into Computation
  - 11.7% place into Algebra
Community & Student Population

- Student Population:
  - Male 38.3%
  - Female 61.7%

- Faculty Population:
  - 162 Full Time
  - 360 Adjuncts
  - Full Time Faculty teach 54% of all course sections in the college
Community & Student Population

What are your demographics?
Governance & Structure

• New Jersey Council of County Colleges

The mission of New Jersey’s community colleges is to provide high quality transfer programs, occupational programs, continuing education courses, business support services, and community service programs at a reasonably low cost that lead to student success and respond to local and statewide needs. The mission of the New Jersey Council of County Colleges is to provide statewide leadership for the advancement of the nineteen community colleges of New Jersey, perform sector coordinating responsibilities as required by state law, and coordinate statewide efforts to improve student success.

• Union County College

Transition from Dept. Chairs & Shared Governance to Deans & Participatory Governance
Governance & Structure

From where do your directives & initiatives originate?
Did you know?

• The greatest roadblock to student success is their performance in their first math course.
Placement Testing & Courses

• Until Spring, 2016 – our students followed these parameters:

<table>
<thead>
<tr>
<th>Accuplacer Score</th>
<th>Course</th>
<th>Number of Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computation &lt; 72</td>
<td>Mat 011 Pre-Algebra</td>
<td>4</td>
</tr>
<tr>
<td>Algebra 20 - 52</td>
<td>Mat 015/Mat 016 Intro to Algebra</td>
<td>8</td>
</tr>
<tr>
<td>Algebra 53 - 75</td>
<td>Mat 022 Intro to Algebra</td>
<td>4</td>
</tr>
</tbody>
</table>
Overview of Developmental Courses

All offered face-to-face, hybrid, and online.

• MAT011
• MAT015/MAT016
• MAT022
Description of Developmental Courses

• **Mat 011** — arithmetic operations, fractions, decimals, percents, factors, proportions, signed numbers, and elementary equations.

• **Mat 015/016** — signed numbers, basic exponents, the solution of equations and inequalities, rational expressions (without factoring), graphing linear equations, systems of linear equations and applications / exponents, scientific notation, polynomials, factoring, radicals, rational expressions, quadratics and applications.

• **Mat 022** — a one semester course covering all the topics from Mat 015 and Mat 016
Overview of Gateway Credit Courses

Offered face-to-face, hybrid, and online.

• MAT119 – Intermediate Algebra
• MAT125 – Survey of Special Topics in Mathematics
• MAT127 – Elementary Statistics
Math Major

• Several options:
  • Math Major
  • Math Major – Education Option
  • Math Major – Cybersecurity Option

• Total Credits = 63

• Issues & Changes
Placement & Courses

• How does your college place students?

• What courses are offered?

• Do you offer a Math Major?
Administrative & Grant Concerns

• Completion & Graduation Rates
• Community Standards
• Title V Grant
Completion Rates

• Completion rates (Grades “A” through “D”) have consistently been around 65 – 68% for developmental and gateway courses compared to the College average of approximately 75%
• From 2011 to 2013, about 65% of Math Dept. offerings were developmental
• Mathematics was identified as a roadblock, impacting GPA, financial aid, and ultimately degree completion
• Beginning in 2014, approximately 55 – 58% of Math Dept. offerings have been developmental, so varied efforts are yielding some results.
Other Trends

• Graduation rate has increased from single digits to 15%
• Reduced developmental mathematics offerings
• Of first-time, full-time students 36.8% are in Computation & 11.7% are in Algebra
• Lower percentage of mathematics courses are taught by full-time faculty than the average for College courses
• Majority of developmental courses have been taught by adjuncts
Faculty Concerns

• Student Preparation & Success
• Placement/Registration Issues
• Conflicting Initiatives
Community Standards

• National Initiatives Reviewed
  • Ex: ALP, Quantway, Dana Center, etc.

• NJ Colleges Reviewed
  • Ex: Middlesex, Essex, Camden

• No real consistency – many varied initiatives and approaches
We Have Tried It All!

• Learning Communities
• Course Redesign
• Acceleration of Developmental Courses
• Offering Developmental Courses in Online and Hybrid Formats
• Boot Camps in the Summer and Winter Session
• Creating a STEM and non-STEM Path
Timeline

2009 – NJ placement & curriculum changes per AOA (76 cutoff score for Algebra, entire state)
2011 – Course Redesign – effective approach
2012 – Decision Zone & Multiple Measures
2013 – Accelerated Developmental Courses: MAT014 & MAT018
2013 – Boot Camp
2014 – MAT022 CRD
2015 – STEM/Non-STEM Path & New Courses
Title V Grant

- PreAlgebra – our passing rates from 2007-2010 ranged from 32%-41%. (This included a compulsory schoolwide exit exam.)
- In 2010 the exit exam was eliminated and passing rates rose to 54% in the Fall and 49% in the Spring.
- During the last year of our previous Title V grant, we ran a pilot in Fall 2011 with 3 classes using Course Redesign and a required Accuplacer score of 40.
- Passing rates soared to 89%, 88%, and 67%.
- In the Spring, 2012, we expanded to 4 preAlgebra and 2 Algebra classes. The results were not quite as good, but very impressive.
What is Course Redesign?

• A non-traditional approach incorporating mastery learning.
• Information technology is the basis for the teaching of the course.
• Students progress at their own pace with a set minimum schedule that assures they will finish on time.
Students are required to either watch instructional videos or read the e-text and take notes.
Instructors deliver a brief overview of the material including practice problems from the workbook and answer any questions the students have.
Students complete homework assignments on the website. A mastery level of 80% must be achieved.
After completing a practice test students are required to submit their notebooks for grading before being allowed to take the chapter test on the computer.
• Students must attain a grade of 75% or higher to move on to the next chapter.
• Professors review tests individually with students
• Test results create an Individual Study Plan (ISP) that students are required to complete and achieve a score of 100%
• Students who do not attain a 75% are able to retest one time.
Title V Grant – LEAP
(Learning Enhanced Through Accelerated Paths)

• During the first year of LEAP (Spring 2013), we ran a new course, Mat 014 which was 6 credits and combined Mat 011 and the first half of Mat 015)
• The passing rate was 75%
• When the same course ran in Fall, 2013, the passing rate was 100%. Also during Fall, 2013, we offered Mat 018, the second half of Mat 015 and all of Mat 016. The passing rate was 81%.
• In spite of its huge success, recruitment was difficult and Mat 014/Mat 018 was abandoned and replaced with Mat 022 and Boot Camps.
• Students attend Boot Camps during the Summer and Winter sessions in order to test out of developmental courses or test into a higher level of developmental mathematics
New Courses & STEM/Non-STEM

• MAT017/MAT019 – Proposed as five credit course for all students. Will be implemented as three credit lecture and one credit lab. Equivalent to five hours per week.

• (The delivery of this class will be in Course Redesign format)

• MAT021 – STEM students only. Four credit course, second in sequence to build skills needed for more rigorous mathematics requirements.
Summary

• Researched extensively & tried multiple approaches
• Course Redesign (CRD) is successful – requires computer classroom
• Accelerated CRD developmental now underway, using successful elements of pedagogy & accelerated paths from our prior trials
• STEM/Non-STEM paths so students take what is appropriate for them
• Keep trying for the right path for your students!
Your Story...
Share your initiatives.
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